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Kathy Manke
Avago Technologies Limited
4380 Ziegler Road
Fort Collins, CO 80525

EXAMINER	
MOON, SEOKYUN	

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kathy.manke@avagotech.com
adrienne.barclay@avagotech.com

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/771,738
Filing Date: February 04, 2004
Appellant(s): NISHIMURA ET AL.

John R. Pessetto
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on April 7, 2008 appealing from the Office action mailed on October 19, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,064,358	Kitajima	5-2000
6,677,925	Kawaguchi	1-2004

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4, 7, 10, 13, 14, 16-19, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitajima.

As to claim 1, Kitajima teaches a drive circuit for driving a display device [col. 1 lines 10-13] comprising electro-optical material ("*liquid crystal 57*") [fig. 11] disposed between a common electrode ("*common electrode 63*") and an array of pixel electrodes ("*display electrodes 54*") [col. 15 lines 43-46], the drive circuit comprising:

pixel drive circuits ("*thin film transistors 103*") [fig. 11] connected to respective ones of the pixel electrodes and operable to generate respective pixel drive signals ("*VD*") [fig. 26(d)] alternating between a first high voltage ("*VDH*") and a first low voltage ("*VDL*") differing in voltage by less than or equal to a process-limited maximum ("*VDH*"); and

a common drive circuit ("*206*") [fig. 1] connected to the common electrode and operable to generate a common drive signal ("*VC*") [fig. 26(d)] alternating between a second high voltage ("*VCH*") and a second low voltage ("*VCL*") differing in voltage by more than the process-limited maximum, the common drive signal being asymmetrically bipolar with respect to the first low voltage.

As to claim 2, Kitajima inherently teaches that the first low voltage ("*VDL*") and the second low voltage ("*VCL*") differ in voltage by less than or equal to a threshold voltage ("*VDH - VCL*") [col. 17 lines 62-64] at which an electro-optical response is produced by the electro-optical material ("*liquid crystal element*") since if the voltage difference between the lowest voltage of the signal applied to the common electrodes and the lowest voltage of the signal applied to the data electrodes is greater than the threshold voltage, the liquid crystals included in the pixels of the display would be controlled by the

voltage difference, and thus the liquid crystals of the display would not control the transmission the back light at the right timing.

As to claim 3, Kitajima teaches that the first high voltage ("*VDH*") [fig. 26(d)] and the second high voltage ("*VCH*") differ in voltage by less than or equal to the threshold voltage ("*VDH - VCL*") since if the voltage difference between the highest voltage of the signal applied to the common electrodes and the highest voltage of the signal applied to the data electrodes is greater than the threshold voltage, the liquid crystals included in the pixels of the display would be controlled by the voltage difference, and thus the liquid crystals of the display would not control the transmission the back light at the right timing.

As to claim 4, Kitajima teaches the common drive signal ("*VC*") [fig. 26(d)] being substantially periodic between the second low voltage ("*VCL*") and the second high voltage ("*VCH*").

As to claim 7, Kitajima teaches the pixel drive circuits ("*thin film transistors 103*") [fig. 11] being located on a substrate ("*transparent glass substrate 56*") of the display device including the array of pixel electrodes ("*display electrodes 54*"), the pixel drive circuits underlying respective ones of the pixel electrodes.

As to claim 10, Kitajima teaches the common drive circuit ("*206*") [figs. 1 and 3] being located external to the substrate.

As to claims 13 and 16, Kitajima inherently teaches the process-limited maximum being less than or equal to 1.8 volts which is a breakdown voltage of the pixel drive circuits since the 180 nm transistors included in the pixel drive circuits have a breakdown voltage of 1.8 volts and thus it is required for the device of Kitajima to set the process-limited maximum of the pixel drive signals being less than or equal to 1.8 volts in order to prevent breakdown of the drive circuits.

As to claim 14, Kitajima teaches at least one of the pixel drive circuits and the common drive circuit being further operable to vary the phase relationship (whether the two signals are in the same

polarity phase or different polarity phase with respect to a reference level) between the respective pixel drive signals ("*VD*") and the common drive signal ("*VC*") [fig. 26(d)].

As to claim 17, all of the claim limitations have already been discussed with respect to the rejection of claim 1.

As to claim 18, Kitajima teaches the method further comprising:

determining a threshold voltage ("*VDH - VCL*") [col. 17 lines 62-64] at which an electro-optical response is produced by the electro-optical material; and

setting the first low voltage ("*VDL*") [fig. 26(d)] and the second low voltage ("*VCL*") to differ in voltage by less than or equal to the threshold voltage and the first high voltage ("*VDH*") and the second high voltage ("*VCH*") to differ in voltage by less than or equal to the threshold voltage.

As to claim 19, all of the claim limitations have already been discussed with respect to the rejection of claim 4.

As to claim 21, all of the claim limitations have already been discussed with respect to the rejection of claims 7 and 10.

Claims 8, 11, 20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima.

As to claim 8, Kitajima teaches the common drive circuit being located external to the substrate [figs. 1 and 3].

Kitajima does not teach the common drive circuit being located on the substrate.

However, since the Applicants have failed to disclose that implementing the common drive circuit on the substrate instead of implementing the circuit external to the substrate provides an advantage, is used for a particular purpose, or solves a state problem, it is an obvious matter of design choice to include the common drive circuit on the substrate.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the common drive circuit either on the substrate or external to the substrate since any one of the implementation would perform equally well at providing pixel drive signals and the common drive signals to display elements of a display.

As to claim 11, Kitajima teaches a timing circuit ("*timing signal generating circuit 204B*") [fig. 1] connected to the common drive circuit ("*206*") to control the timing of the common drive signal.

Kitajima does not expressly disclose the timing circuit being included on the substrate.

However, Examiner takes official notice that it is well known in the art to implement a timing circuit, i.e. timing controller, of a display device on a substrate which includes pixel drive circuits and pixel electrodes.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Kitajima to include the timing circuit of the device on the substrate on which the pixel drive circuits and the pixel electrodes are formed, in order to reduce the number of substrates required to implement the drive circuits of the display.

As to claim 20, all of the claim limitations have already been discussed with respect to the rejection of claims 7 and 8.

As to claim 22, all of the claim limitations have already been discussed with respect to the rejection of claim 11.

Claims 12, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima in view of Kawaguchi.

As to claim 12, Kitajima teaches the timing circuit ("*timing signal generating circuit 204B*") [fig. 1] alternates between the first low voltage ("*VDL*") [fig. 26(d)] and the first high voltage ("*VDH*") and the common drive circuit outputting the second low voltage ("*VCL*") and the second high voltage ("*VCH*").

Kitajima does not teach the common drive circuit converting the first low voltage to the second low voltage and the first high voltage to the second high voltage.

However, Kawaguchi teaches a display device [fig. 1] adopting a method of using pixel drive signals to generate a common drive signal [col. 23 lines 9-26].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the common drive circuit of Kitajima to use the pixel drive signals to generate the common drive signal by converting the first low voltage and the first high voltage of the pixel drive signals to the second low voltage and the second high voltage of the common drive signal, as taught by Kawaguchi, in order to simplify the structure of the voltage generating circuitry of the common drive circuit.

As to claim 23, all of the claim limitations have already been discussed with respect to the rejection of claim 12.

As to claim 24, all of the claim limitations have already been discussed with respect to the rejection of claim 14.

(10) Response to Argument

Claims 1 and 17

The Applicant [Appeal, pg 8-9] argues that Kitajima does not teach a common drive circuit connected to a common electrode and operable to generate a common drive signal alternating between a second high voltage and a second low voltage differing in voltage by more than a process-limited maximum and pixel drive circuits connected to respective ones of the pixel electrodes and operable to generate respective pixel drive signals alternating between a first high voltage and a first low voltage

differing in voltage by less than or equal to a process-limited maximum. Specifically, the Applicant argues that the term, "process-limited" disclosed in the claims refers to modern integrated circuit process, not a signal driving process, and thus Kitajima does not teach the claim limitation, "*process-limited maximum*".

Examiner respectfully disagrees.

Examiner respectfully submits that interpretation of a claim term is not necessarily limited to the meaning of the term disclosed or shown in the specification of the instant Application. In this case, the specification of the instant Application might disclose the term, "*process-limited maximum*" as being the value corresponding to "*breakdown voltage*" of a circuit, for one embodiment of the instant invention, but the claim fails to define the term in such ways. Since the term, "*process-limited maximum*", is not a well defined term in the art, it would be reasonable to one of ordinary skill in the art to interpret the term, "*process-limited maximum*", as any maximum value during any process. Furthermore, even if the term is to be interpreted as a breakdown voltage of a circuit, Kitajima would still teach the claim limitation since if the pixel drive circuits are driven with a voltage greater than the breakdown voltage of the pixel drive circuits, the circuits would be broken down and thus the driving voltage must be less than or equal to the breakdown voltage.

Accordingly, Examiner respectfully submits that the Applicant's arguments regarding the claim limitation is not persuasive.

Claims 2 and 18

The Applicant [Appeal, pg 11-12] argues that Kitajima does not teach the first low voltage and the second low voltage differing in voltage by less than or equal to a threshold voltage at which an electro-optical response is produced by an electro-optical material.

Examiner respectfully disagrees.

Examiner respectfully submits that Examiner construed the disclosed threshold voltage as a voltage producing an operational electro-optical response by the electro-optical material. Examiner believes that such interpretation is consistent with the specification of the instant invention. Specifically, one embodiment of the instant invention discloses the electro-optical material as being liquid crystal material. If any voltage causing the liquid crystal material to start to rotate/move regardless of the degree of the rotation/movement is construed as a threshold voltage, then the threshold voltage is 0 since any voltage greater than 0 would cause the liquid crystal material to rotate/move. Then, any voltage other than 0 voltage regardless of the polarity of the voltage is construed as a voltage greater than the threshold voltage. In that case, the difference between the first low voltage and the second low voltage would not be less than or equal to the threshold voltage. Thus, such interpretation renders the claim to fail to comply with the enablement requirement. Accordingly, Examiner respectfully submits that interpretation of the threshold voltage as being a voltage producing an operational electro-optical response is reasonable in light of the specification of the instant Application. If the disclosed threshold voltage is construed as a voltage producing an operational electro-optical response by the electro-optical material, the difference between the first low voltage and the second low voltage is less than or equal to the threshold voltage since V_{DH}-V_{CL} is the voltage producing an operational electro-optical response by the electro-optical material and the difference between the first low voltage and the second low voltage is less than or equal to V_{DH}-V_{CL}. Furthermore, Examiner respectfully submits that the Applicant's reasoning for the argument is not sufficient. The Applicant states, "*the liquid crystals included in the pixels of the display may be controlled by the voltage difference and retain control of the transmission of the backlight with correct timing*". However, Examiner respectfully submits that the Applicant has failed to explain how the transmission of the backlight can be controlled with correct timing to retain control of the transmission of the backlight while the liquid crystals are controlled by the voltages all the time.

Accordingly, Examiner respectfully submits that the Applicant's arguments regarding claims 2 and 18 are not persuasive.

Claim 3

The Applicant [Appeal, pg 14-15] argues that Kitajima does not teach the first high voltage and the second high voltage differing in voltage by less than or equal to a threshold voltage at which an electro-optical response is produced by an electro-optical material.

Examiner respectfully disagrees.

Examiner respectfully submits that Examiner construed the disclosed threshold voltage as a voltage producing an operational electro-optical response by the electro-optical material. Examiner believes that such interpretation is consistent with the specification of the instant invention. Specifically, one embodiment of the instant invention discloses the electro-optical material as being liquid crystal material. If any voltage causing the liquid crystal material to start to rotate/move regardless of the degree of the rotation/movement is construed as a threshold voltage, then the threshold voltage is 0 since any voltage greater than 0 would cause the liquid crystal material to rotate/move. Then, any voltage other than 0 voltage regardless of the polarity of the voltage is construed as a voltage greater than the threshold voltage. In that case, the difference between the first high voltage and the second high voltage would not be less than or equal to the threshold voltage. Thus, such interpretation renders the claim to fail to comply with the enablement requirement. Accordingly, Examiner respectfully submits that interpretation of the threshold voltage as being a voltage producing an operational electro-optical response is reasonable in light of the specification of the instant Application. If the disclosed threshold voltage is construed as a voltage producing an operational electro-optical response by the electro-optical material, the difference between the first high voltage and the second high voltage is less than or equal to the threshold voltage since V_{DH}-V_{CL} is the voltage producing an operational electro-optical response by the electro-optical material and the difference between the first high voltage and the second high voltage is less than or equal

to VDH-VCL. Furthermore, Examiner respectfully submits that the Applicant's reasoning for the argument is not sufficient. The Applicant states, "*the liquid crystals included in the pixels of the display may be controlled by the voltage difference and retain control of the transmission of the backlight with correct timing*". However, Examiner respectfully submits that the Applicant has failed to explain how the transmission of the backlight can be controlled with correct timing to retain control of the transmission of the backlight while the liquid crystals are controlled by the voltages all the time.

Claims 13 and 16

The Applicant [Appeal, pg 19-20] argues, "*the fact that other factors might lower the amplitude of the breakdown voltage is insufficient to read on claims 13 and 16*".

Examiner respectfully disagrees.

Examiner notes that the above Applicant's arguments are regarding Examiner's response to the Applicant's arguments filed on July 31, 2007.

In the Applicant's arguments [pg 11 4th paragraph] filed on July 31, 2007, the Applicant argued that concluding an 180nm transistor to have 1.8 breakdown voltage is not correct since the breakdown voltage of a transistor is a function of more than just the thickness of an insulator of the transistor. In response to the arguments, Examiner explained that other factors might lower the breakdown voltage of a transistor, in the Final Office Action mailed on October 19, 2007. Examiner intended to indicate the Applicant that other factors might lower the breakdown voltage of a transistor, but would not make the breakdown voltage of the transistor to be higher than 1.8V. Examiner respectfully submits that Examiner's rejection is not based on the fact that other factors might lower the breakdown voltage of a transistor, but is based on the fact that other factors will not make the breakdown voltage of the transistor to be higher.

Accordingly, Examiner respectfully submits that the Applicant's arguments regarding claims 13 and 16 are not persuasive.

Claims 12, 23, and 24

The Applicant [Appeal, pg 25-30] argues that the combination/modification of the references is based solely on hindsight derived from the specification of the instant Application.

However, Examiner respectfully submits that the Applicant has failed to provide a reason or an explanation of asserting that the combination/modification of the references is based solely on hindsight.

Accordingly, Examiner respectfully submits that the Applicant's arguments regarding claims 12, 23, and 24 are not persuasive.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Seokyun Moon/ Examiner, Art Unit 2629

June 19, 2008

Conferees:

/Sumati Lefkowitz/
Supervisory Patent Examiner, Art Unit 2629

/Amare Mengistu/
Supervisory Patent Examiner, Art Unit 2629